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REMARKS

Applicants appreciate the continued thorough examination of the present application and the Examiner's withdrawal of the rejections from the last Official Action. Applicants will now show that the pending claims are patentable over the newly cited combinations of references.

Independent Claims 3 and 15 Are Patentable Over U.S. Patent 6,531,328 to Chen In View of U.S. Patent 6,599,768 to Chen and U.S. Patent 6,219,223 to Kobayashi et al.

Independent Claims 3 and 15 were rejected under 35 USC §103(a) as being unpatentable over U.S. Patent 6,531,328 to Chen in view of U.S. Patent 6,599,768 to Chen. In rejecting Claims 3 and 15, U.S. Patent 6,219,223 to Kobayashi et al. also was cited.

Independent Claim 3 recites:

3. A mounting substrate for a semiconductor light emitting device comprising:
a solid aluminum block including a cavity in a face thereof that is configured for mounting a semiconductor light emitting device therein;
a conformal insulating coating comprising aluminum oxide on a surface of the solid aluminum block, and in the cavity; and
first and second spaced apart conductive traces on the conformal insulating coating in the cavity that are configured for connection to a semiconductor light emitting device.

Moreover, independent Claim 15 recites:

15. A light emitting device comprising:
a solid aluminum block including a cavity in a face thereof and a conformal aluminum oxide coating on a surface thereof including in the cavity;
first and second spaced apart conductive traces on the conformal aluminum oxide coating in the cavity;
a semiconductor light emitting device that is mounted in the cavity and is connected to the first and second spaced apart conductive traces;
a lens that extends across the cavity; and
an encapsulant between the semiconductor light emitting device and the lens.

The Official Action concedes, at Page 3, that:

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But, Chen (328) does not disclose a solid block is aluminum and an insulating layer 15 is aluminum oxide.

Applicants agree with the Examiner's assessment. However, Applicants also wish to point out that the entire disclosure of Chen '328 is predicated on the use of silicon.

See, for example, the very first paragraph of Chen '328 at Column 1, lines 5-16:

1. Field of the Invention

The present invention is related to the packaging of light-emitting diode that mainly uses silicon wafers as the packaging substrates. Silicon wafers with (100) or (110) crystallization orientation can be etched to form minute groove reflectors. Oxidation treatment can provide good electrical insulation effect. Besides, the packaging process uses silicon rubber dipping (heat resistance up to 200° C.) and does not need a molding process. The present invention has advantages such as high heat resistance, easy production of groove reflector, good heat dissipation, easy miniaturization, so it is much better than traditional SMD LED.

Accordingly, Chen '328 is directed to the use of silicon wafers to package LEDs.

Despite this clear teaching by Chen '328, the Examiner cites one sentence of Chen '768, to provide a "motivation" for replacing Chen's silicon block with an aluminum block. See Chen '768, Column 4, lines 62-65:

The base substrate 100 must have high electric & thermal conductivity selected from material such as copper, aluminum, or silicon all can be selected as ideal candidate.

Applicants respectfully submit that it would not be obvious to substitute aluminum for silicon in Chen '768, because, as was described above, Chen '328 is predicated upon the use of silicon wafers.

Moreover, even if such a substitution was made, the Official Action concedes that neither Chen '328 nor Chen '768 describes the use of a conformal aluminum oxide coating, as recited in Claims 3 and 15. Indeed, Applicants respectfully submit that Chen '768 teaches away from such a coating. In particular, as recited in Chen '768, Column 5, lines 20-26:

Referring to FIG. 3D, an insulating layer 106 is then coated to refill the trenches 105. The material of insulating layer 106 may be selected from a SOG (spin on glass) or polyimide or BCB (B-stage bisbenzocyclobutene; BCB) layer, and the like which has characteristic of coating easily, less or free void while refilling deep trenches, and having highly thermal tolerance.

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Accordingly, Chen '768 teaches the use of SOG, polyimide or BCB, to provide a conformal coating, and teaches away from the use of aluminum oxide.

In an unsuccessful attempt to supply the missing teaching, the Official Action cites U.S. Patent 6,219,223 to Kobayashi et al. Kobayashi et al. is entitled "*Solid Electrolyte Capacitor and Method of Producing the Same*", and is unrelated to mounting substrates for LEDs. The Official Action cites the following passage from Kobayashi et al., at Column 4, lines 30-35:

As shown, a porous sintered body is formed by etching aluminum foil or sintering tantalum powder or niobium powder (step S1). The etched aluminum foil or the sintered body is subjected to anodic oxidation in order to form a dielectric oxide film on its surface (step S2).

However, this disclosure of anodically oxidizing an etched aluminum foil or a sintered body for a capacitor does not suggest the use of a conformal insulating coating comprising aluminum oxide in a mounting substrate for a semiconductor LED. Moreover, the disclosure of Chen '328 would not be used in place of the clear teaching of Chen '768 to use SOG, polyimide or BCB.

To establish a *prima facie* case of obviousness, the prior art reference or references when combined must teach or suggest all the recitations of the claims, and there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. See M.P.E.P. § 2143. The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art *also suggests the desirability of the combination*. See M.P.E.P. § 2143.01(citing *In re Mills*, 916 F.2d 680, 16 U.S.P.Q.2d 1430 (Fed. Cir. 1990)). As emphasized by the Court of Appeals for the Federal Circuit, to support combining references, evidence of a suggestion, teaching, or motivation to combine must be *clear and particular*, and this requirement for clear and particular evidence is not met by broad and conclusory statements about the teachings of references. *In re Dembiczak*, 50 U.S.P.Q.2d 1614, 1617 (Fed. Cir. 1999). In another decision, the Court of Appeals for the Federal Circuit has stated that, to support combining or modifying references, there must be particular evidence from the prior art as to the reason the skilled artisan, with no knowledge of the claimed invention, would have

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selected these components for combination in the manner claimed. *In re Kotzab*, 55 U.S.P.Q.2d 1313, 1317 (Fed. Cir. 2000).

The Official Action has substituted the Chen '768 aluminum block for the Chen '328 silicon block, contrary to the clear teachings of Chen '328. The Official Action also has substituted Kobayashi et al.'s anodically oxidized aluminum foil for the Chen '768 SOG, polyimide or BCB, contrary to the clear teachings of Chen '768. The references do not suggest the desirability of the combination; they actually teach away from the combination. One can only conclude, then, that the rejection based on Chen '328, Chen '768 and Kobayashi et al. is based on a hindsight reconstruction of the claimed invention and, as such, is impermissible. Stated differently, there is no motivation in Chen '328 to use any material other than silicon, and there is no motivation in Chen '768 to use a conformal coating layer other than SOG, polyimide or BCB. The combination of:

...a solid aluminum block including a cavity in a face thereof that is configured for mounting a semiconductor light emitting device therein;

a conformal insulating coating comprising aluminum oxide on a surface of the solid aluminum block, and in the cavity...,

as recited in Claim 3, and the combination of:

...a solid aluminum block including a cavity in a face thereof and a conformal aluminum oxide coating on a surface thereof including in the cavity...,

as recited in Claim 15, is only taught by the present application. For at least these reasons, independent Claims 3 and 15 are unobvious over the cited references. Dependent Claims 4-7, 9-14 and 16-20 are patentable at least per the patentability of the independent claims from which they depend.

Many of the Dependent Claims Are Separately Patentable

Dependent Claims 4-5, 10-14 and 16-17 were rejected under 35 USC §103(a) as being unpatentable over U.S. Patent 6,531,328 to Chen in view of U.S. Patent 6,599,768 to Chen. U.S. Patent 6,219,223 to Kobayashi et al. was also cited in this rejection. Moreover, Claims 9 and 18-20 were rejected under 35 USC §103(a) as being unpatentable over U.S. Patent 6,531,328 to Chen and U.S. Patent 6,599,768 to

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Chen, further in view of U.S. Published Patent Application US 2004/0222433 to Mazzochette et al.

The dependent claims are patentable at least as depending from patentable independent Claims 3 and 15. Moreover, many of the dependent claims are separately patentable for the reasons that will now be described.

For example, Claim 4 recites:

4. A mounting substrate according to Claim 3 wherein face is a first face and wherein the first and second spaced apart conductive traces extend from the cavity to the first face, around at least one side of the aluminum block and onto a second face of the aluminum block that is opposite the first face. (Emphasis added.)

Respectfully, Chen '328 Figures 9 and 17 do not appear to describe that the coating extends around a side of the aluminum block.

Moreover, Claim 9 recites:

9. A mounting substrate according to Claim 3 wherein the face is a first face and wherein the solid aluminum block includes therein first and second through holes that extend from the first face to a second face of the solid aluminum block that is opposite the first face, the respective first and second through holes including the conformal insulating coating thereon that comprises aluminum oxide and a respective first and second conductive via therein that extends from the first face to the second face and wherein a respective one of the spaced apart conductive traces is electrically connected to a respective one of the conductive vias. (Emphasis added.)

The Official Action concedes at Page 6 that Chen '328 and Chen '768 do not describe or suggest "the through holes including the conformal insulating coating thereon". In an attempt to supply the missing teaching, the Official Action cites U.S. Patent Application Publication US 2004/0222433 to Mazzochette et al. Mazzochette et al. describes an electrically insulated via in a package for an LED. However, Mazzochette et al.'s packaging substrate includes a ceramic layer 17, a metal base 11 and a glass layer (GLASS). There is no description or suggestion in Mazzochette et al. to provide first and second through holes including a conformal insulating coating of aluminum oxide and conductive vias therein. Accordingly, Claim 9 is separately patentable.

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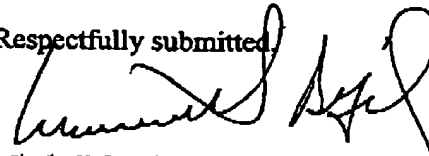
Claim 16 is independently patentable for the same reasons that were described above in connection with Claim 4. This analysis will not be repeated for the sake of brevity.

Finally, Claim 18 is patentable for the same reasons that were described above in connection with Claim 9. This analysis will not be repeated for the sake of brevity.

Conclusion

Applicants again appreciate the continued thorough examination and the withdrawal of the earlier rejections. However, Applicants have shown above that the rejection of the independent claims based on the combination of three references was made notwithstanding clear teachings away from the combination. Moreover, many of the dependent claims are separately patentable. Accordingly, Applicants respectfully request withdrawal of the outstanding rejections and allowance of the present application.

Respectfully submitted,

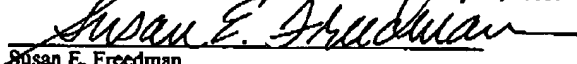


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